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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/048,058	01/25/2002	Fuminori Yamanashi	040302-0284	8726
22428	7590	02/27/2004		
FOLEY AND LARDNER SUITE 500 3000 K STREET NW WASHINGTON, DC 20007			EXAMINER YUAN, DAH WEI D	
			ART UNIT 1745	PAPER NUMBER

DATE MAILED: 02/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/048,058

Applicant(s)

YAMANASHI, FUMINORI

Examiner

Dah-Wei D. Yuan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1, 13 and 14 is/are rejected.
- 7) ☒ Claim(s) 2-12 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 01252002.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

FUEL CELL SYSTEM FOR MOVING BODY AND CONTROL METHOD THEREOF

Examiner: Yuan

S.N. 10/048,058

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February 23, 2004

Claim Objections

1. Claim 1 is objected to because of the following informalities:

The scope of the following phrase in claim 1 is not clear "supplies minimum gas including oxygen required for maintaining a temperature of said carbon monoxide removing reactor to said carbon monoxide removing reactor" in lines 26-29. It is suggested the recitation to be edited as follows "supplies minimum gas including oxygen required for maintaining a temperature of said carbon monoxide removing reactor is supplied to said carbon monoxide removing reactor".

Appropriate corrections are required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1,13,14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Motozono et al. (US 6,638,652 B1) in view of Benz et al. (US 6,676,907 B1).

Motonzono et al. teach a fuel cell-powered vehicle comprising a reformer (6) that is designed to reform a mixture of methanol as reformat fuel and water into hydrogen and carbon

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dioxide. The reformer is composed of a heater for heating the reformat fuel, a reforming unit (21), and a carbon monoxide oxidizing unit (22). The vehicle further comprises a fuel cell (1) downstream of the reforming unit and the CO oxidizing unit, an injector (26), and an air feeder, which supplies air to the reforming unit and CO oxidizing unit. See Figure 11. The vehicle further comprises an electronic control unit (37) (running state detecting section), which determines the reformat fuel amount by calculating according to the output current of the fuel cell detected by the current sensor (14), stored data and program and issues a command signal to the pump so as to supply the determined amount of reformat fuel. The output related quantity can be the opening degree of the accelerator of the vehicle or the sum of capacities of auxiliary machines in operation. When the active temperature of the catalyst in the reforming unit 21 is relatively high, e.g., about 280°C, the heat for maintaining this temperature is fed from the heat of the reformat fuel and the heat generated by partial oxidation reaction. Therefore, it is necessary to keep supplying the reformat fuel by at least equal to or more than the specified minimum amount in order to maintain the catalyst at the active temperature. Accordingly, in step 24, the reformat methanol amount at the time of idling of the reformer 6, that is, the lower limit value of the reformat fuel, and the reformat methanol amount F_m determined through step 23 are compared, and the larger value is selected and issued as reformat methanol command value. Therefore, if the reformat gas demanded in the fuel cell 1 is slight, the reformat fuel more than the predetermined lower limit is supplied into the reforming unit 21 as mentioned above, so that the temperature of the reformat catalyst is maintained above the active

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temperature or predetermined specific temperature. See Column 8, Lines 15-41; Column 9, Lines 7-50; Column 10, Lines 46-65; Column 12, Lines 13-21.

However, Motozono et al. do not teach the supply of gas including oxygen to maintain the temperature of the carbon monoxide removing reactor. Benz et al. teach a mobile methanol reforming systems for fuel cell operated motor vehicles. Particularly for this mobile application, there are the requirements (1) of rapidly reacting to typical load changes in the vehicle, and (2) of being able to supply hydrogen for the fuel cells as fast as possible after the system start, and achieving this by means of a relatively compactly constructed reforming system. As the result of the coupling of the carbon monoxide removal unit stage 2.2 with the first stage 1.1. of the reforming unit 1, the output temperature of the second stage 2.2 of the carbon monoxide removal unit 2 is low because, as the result of the endothermic reaction in the first reforming stage 1.1, the reactor temperature at the output of the carbon monoxide removal unit 2 is clearly lowered by the thermal coupling. This results in an advantageous low carbon monoxide outlet concentration of the carbon monoxide removal unit 2. The resulting temperature profile can be adjusted by way of an air apportioning in the carbon monoxide removal unit 2 largely independently of the load. Thus, high dynamics of the system can be achieved. In principle, a measured introduction of air can also be individually adjusted at any stage 2.1, 2.2 of the carbon monoxide removal unit 2. See Column 1, Lines 9-17; Column 3, 1-27. Therefore, it would have been obvious to one of ordinary skill in the art to maintaining the flow of air in the carbon monoxide removal unit regardless of the load condition of the vehicle of Motozono et al., because Benz et al. teach the use of such practice to achieve high dynamics of the system in a fuel cell-powered vehicle.

Allowable Subject Matter

4. Claims 2-12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 2-12 would be allowable because the prior art does not disclose or suggest the inclusion of a combustor for processing discharged reformed gas and discharged gas, wherein said control section supplies minimum gas including oxygen required for maintaining temperature of said combustor when it is judged that said moving body was running and said accelerator was closed based on the information of said running state detecting section and said accelerator opening detecting section.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dah-Wei D. Yuan whose telephone number is (571) 272-1295. The examiner can normally be reached on Monday-Friday (8:00-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan, can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

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system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Dah-Wei D. Yuan
February 23, 2004

A handwritten signature in black ink, appearing to read "Dah-Wei D. Yuan", with a long horizontal flourish extending to the right.